THE additions to the Zoological Society's Gardens during the past week include a Rhesus Monkey (*Macacus erythræus*) from India, presented by Mr. R. Roberts; a Macaque Monkey (*Macacus cynomolgus*) from India, presented by Mrs. Gibbs; two Lesser White-throats (*Sylvia sylvieila*), two Yellow Wagtails (*Motacilla flava*), European, presented by Mr. Augustus E. Field; two Central American Agoutis (*Dasyprocta punctata*) from Central America, presented by Mr. W. G. Davis; a Polar Bear (*Ursus maritimus*), Arctic Regions; a Smooth-headed Capuchin (*Cebus monachus*) from S.E. Brazil; a White-throated Capuchin (*Cebus hypoleucus*) from Central America; a Golden Eagle (*Aquila chrysaëtus*) from Hudson's Bay; two Maximilion's Aracaris (*Pteroglossus wiedi*) from Brazil, deposited; two Golden Agoutis (*Dasyprocta aguti*), born in the Gardens.

*ELEVENTH REPORT OF THE COMMITTEE FOR EXPLORING KENT'S CAVERN, DEVONSHIRE**

THE Committee have again the melancholy duty of reporting that death has deprived them of one of their members. As long ago as 1859, as soon as he became aware of the importance of the discoveries made in the Windmill Hill Cavern at Brixham, Sir Charles Lyell expressed a strong desire that Kent's Cavern should also be systematically and thoroughly explored; and it was with his full concurrence that the proposal to do so was laid before the Committee of the Geological Section of the British Association at Bath in 1864, the day after he delivered his Presidential Address, whilst his ardent advocacy, together with that of the late Prof. Phillips, secured its ready acceptance by the Committee of Recommendations and the General Committee. At the first meeting of the Cavern Committee, appointed in the year just mentioned, he was unanimously elected chairman, and he continued to occupy that post until his lamented decease on Feb. 27, 1875. Though the state of his health prevented him from taking any active part in the exploration, his interest in the work never abated; he always carefully studied the Monthly Reports of Progress sent him by the superintendents, and he made careful arrangements for their preservation.

The Tenth Report, read to the Geological Section of the Association at the Belfast meeting, and printed in the annual volume for last year, brought up the work to the end of July 1874. The exploration has been carried on without interruption from that date to the present time; the mode of excavation adopted at the beginning has been uniformly followed; the superintendents have visited the cavern daily; the progress of the work has been carefully recorded in the cavern diary; the workmen have, as heretofore, given complete satisfaction; and Monthly Reports have been regularly sent to Sir Charles Lyell until his decease, and subsequently to Mr. John Evans.

The cavern continues to be much visited by persons desirous of studying on the spot its characters and phenomena; and during the last twelve months the superintendents have had the pleasure of taking a large number of visitors through those branches which have been explored, and of explaining to them the mode of operation. Probably a still larger number have been conducted by the "guide," who, though under the control of the committee, is not permitted to take parties to those branches of the cavern in which the exploration is in progress, or has not been begun.

As in former years, rats have frequently been seen running about in various parts of the cavern, including those in which the men have been at work, though hundreds of feet from any glimmering of daylight; and they have displayed their usual boldness as well as their skill in carrying off candles. In other branches, almost as far from the entrances, where all researches have ceased for some years, their footprints are to be seen in great numbers, especially on the silt left, here and there, where the drip is copious in wet weather.

On Jan. 29, 1875, a "buzzing fly" was seen and heard about 300 feet from daylight.

Clinnick's Gallery:—The Tenth Report (1874) stated that the exploration of Clinnick's Gallery was in progress, and had been completed for about 34 feet; that below the least ancient, or the Granular, Stalagmitic Floor, for a distance of 18 feet from its entrance, a small quantity of "cave earth" uniformly presented itself, beneath which lay the Breccia, occasionally separated from it by remnants of the more ancient, or Crystalline, Stalagmitic Floor *in situ*; but that from the point just named, up to that reached when the Tenth Report was drawn, there was no cave earth, so that the two Stalagmites lay the one immediately on the other, with the Breccia, that is, so far as is known, the oldest of the cavern deposits, beneath the whole.

At the commencement of the exploration of this gallery, the deposits so very nearly reached the roof as to induce the belief that a very few feet at most was all that the workmen had before them. As the work advanced, however, the unoccupied interspace between the roof and floor became gradually larger, until on Aug. 6, 1875, John Clinnick, one of the workmen, forced himself through, and, after proceeding about 50 feet by estimation, entered a large chamber, into which he was followed by one of the superintendents. The chamber, probably one of the largest in the cavern, is beautifully hung with Stalactites, and has numerous Stalagmitic "paps," some of them four feet high, and of almost cylindrical form, rising from a floor of the same material.

Clinnick's Gallery, on being excavated, was found to be a somewhat tortuous passage, varying from four to eight feet in width, and from seven to ten feet in height. That it was once a watercourse there can be little doubt, as the roof bears the marks of the long-continued action of a running stream. The walls vary considerably, being in some places smooth, in others much fretted or corroded, and in others more or less angular.

The objects of interest found in this branch of the cavern during the last twelve months have been by no means numerous; nevertheless, they are not without considerable interest.

Attached to the upper surface of the Granular Stalagmitic Floor portions of three land-shells were found, and about twenty bones of mammals were met with lying together loose on the floor. Their characters imply a recent introduction into the cavern.

Incorporated in the Granular Stalagmitic Floor itself were a few bones, including a humerus, a tibia, and an ulna, each nearly entire, and a portion of a large humerus, all of which had been gnawed.

Though no cave earth was met with beyond the point already specified, there seems no doubt that to the era of that deposit may be referred a considerable portion of a radius and of an ulna, both gnawed and found under loose pieces of stalagmite.

The remains found in the Breccia were four teeth of bear, a few bones and fragments of bone, and three teeth of lion in three portions of, no doubt, one and the same lower jaw. The latter "find" (No. 6,482) is of considerable interest, as being the first known instance of remains of any animal besides bear met with in the Breccia. Though the superintendents had no doubt of the feline character of the teeth, they forwarded one of them to Mr. G. Busk, F.R.S., a member of the committee, remarking that they believed it to be the last lower left molar of *Felis spelæa*, and requesting his opinion on it. In his reply, he remarks: "There is no doubt that the tooth is the left lower carnassial of *Felis leo*, but it is of very unusual size, being, I should estimate, one-twelfth bigger than the average dimensions of that tooth in the lion. It is usually longer, but not so thick, in the tiger than in the lion, but the thickness of the present one is proportionate to its length. Another peculiarity, as it seems to me, is the great wear that the tooth has undergone. I fancy existing lions are not allowed to live long enough to wear their teeth so much. At any rate the Kent's Hole tooth appears to be more worn than any other I have as yet met with. Can it belong to Machairodus?" Having succeeded in removing some part of the matrix encrusting the other portions of the jaw, they were also forwarded to Mr. Busk, with the observation that the superintendents had carefully considered the question before submitting the first tooth, and had come to the conclusion that the jaw was not that of Machairodus, for, waiving the fact that none of the teeth were serrated, the fang of the canine still remaining in the jaw was much too large for a lower canine of any known species of Machairodus; and it was suggested that it might be worth considering whether the specimen belonged to any of the species of *Felis* found in the forest-bed of Cromer. To this Mr. Busk replied: "The jaw does not appear to present anything unusual. It is, however, a good example to show that the cave lion lived to a good old age."

The Breccia in Clinnick's Gallery also yielded seven specimens of flint and chert, none of which need detailed description.

The comparative paucity of specimens induced the superintendents to suspend operations in that direction for at least a time. The labour of seven months had been expended on it,

* Abstract read at the Bristol meeting of the British Association.

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during which the exploration of the gallery had reached seventy-five feet from the entrance, where the great chamber discovered by Clinnick may be said to begin.

The following is a complete list of the objects of interest found in this gallery from first to last :—Three shells of Helix and about twenty bones of mammals lying on the upper surface of the Granular Stalagmite ; a few gnawed bones incorporated within this stalagmite itself; eight teeth of hyæna and two of fox, a tolerable number of bones and fragments of bone, one large chert implement, and one small flint flake, in the cave earth; and ninety teeth of bear and three of lion in portions of a left lower jaw, a large part of a skull, numerous bones and portions of bone, a flint pebble, and eleven specimens of flint and chert implements, flakes, and chips, including the very fine tool, No. $\frac{1}{6411}$, in the Breccia.

The Cave of Inscriptions.—The chamber in which the Long Arcade terminates has been called "The Cave of Inscriptions," from the number of names, initials, and dates graved on the stalagmite in various parts of it. Besides those on the "Inscribed Boss of Stalagmite" at the entrance of the cave, described in the Tenth Report, inscriptions occur on what is known as the "Hedges Boss" and on the walls of the chamber. There are also a large number of names, &c., smoked on various parts of the roof, as there are, indeed, in almost every branch of the cavern, some of which appear to be of very considerable antiquity. The oldest of the inscribed dates is 1609, and the most modern 1792, but the most conspicuous and most famous of the inscriptions is "Robert Hedges, of Ireland, Feb. 20, 1688."

It was stated in the Tenth Report that the exploration of this cave had been completed up to sixteen feet from its entrance, when it was suspended in order to proceed with Clinnick's Gallery; that the Granular, or less ancient, Stalagmitic Floor was found to be everywhere intact and continuous, and that the Crystalline, or more ancient, Stalagmite lay beneath it; that the latter had been broken by some natural agency, and though in some cases the severed portions remained *in situ*, in others they had been removed and were not always traceable ; that adjacent to the left wall of the cave a wedge-like layer of cave earth lay in its proper place between the stalagmites, and was six inches thick at the wall, but thinned out about a yard from it, beyond which the one floor lay immediately on the other. On resuming the exploration of the cave it was found that the state of the deposits continued to be the same up to thirty-four feet from the entrance, with the single exception that the broken blocks of crystalline stalagmite were never dislodged beyond being faulted to the extent of two or three inches. At and beyond the point just specified, traces of the earlier explorers were again met with in almost every part of the cave, but were found to be limited to the breaking up of the stalagmites and the subjacent deposit to the depth of twelve inches at most. A thin layer of typical cave earth extended throughout the entire chamber, and it was obvious that at the time when the deposition of the cave earth commenced the crystalline stalagmite did not exist as a continuous sheet, for in considerable spaces the cave-earth lay immediately on the breccia without any stalagmite between them, and it was not always easy to determine the exact junction of the two deposits. On the discovery of objects of interest at or near this doubtful junction, care was taken to record them as belonging to the "cave earth and breccia," even though, from their own characters, it was usually easy to refer them to their proper deposits and eras respectively.

The Cave of Inscriptions was found to extend upwards of sixty feet from north-east to south-west, forty-five feet from south-east to north-west, and to be upwards of twenty feet high.

Two "finds" only were met with in the Granular Stalagmitic Floor; one consisting of a few bones, including a portion of a large humerus, whilst the other was a very small bone, probably of bat, with bits of charcoal and of coprolite, all lodged in the same hand specimen.

The cave earth yielded four teeth of hyæna, a few gnawed bones, coprolites on several occasions, and one flint flake.

At and near the junction of the cave earth and breccia, where they were not separated by stalagmite, two right lower jaws and four loose teeth of hyæna, thirty-eight teeth of bear, part of a jaw of fox, one incisor tooth of a small rodent, numerous bones and fragments of bone, a somewhat large number of coprolites, and one flint flake were met with. At least most of the ursine remains may be safely referred to the breccia, whilst all those of hyæna undoubtedly belong to the cave earth. One of the hyæna jaws just mentioned contains all its teeth except the inner incisor, but, as is commonly the case with lower jaws of the era of the cave earth, it has lost its lower border and condyles, and is much gnawed. The other jaw of hyæna has lost the two inner incisor teeth and the condyles, and is slightly gnawed, but is otherwise entire.

There were found in the Breccia eighty-two teeth of bear—some of them in jaws or parts of jaws—two of lion, in a portion of right upper jaw, numerous bones and pieces of bone, including part of a skull and several other good specimens, and thirteen implements, flakes, and chips of flint and chert. The lion's teeth (No. 6,518) are the last two molars. The sockets of the canine tooth and of the small tooth immediately behind it still exist, and everything betokens an animal of great size. The specimen, to which a considerable quantity of the breccia still adheres, is peculiarly interesting as being found in a deposit in which careful methodical research, continued for years, had failed to detect any other osseous remains than those of bear, with but one exception, and that, as already stated, being also the lower jaw of a lion, found less than two months before. This interesting relic was met with on 31st December, with two teeth of bear, bones and fragments of bone, in the second foot-level of Breccia. No feline remains have been detected since that date.

A few only of the flint and chert specimens require description :—

No. 6,550 is an implement made out of a well-rolled chert nodule. It is somewhat semilunar in form, but broader at one end than the other, and measures about 4·4 inches in length, 2·3 inches in greatest breadth, and 2·5 inches in greatest thickness, which it attains near the broader or butt-end. It has undergone a considerable amount of chipping, has been reduced to an irregular edge along the greater part of its perimeter, and is comparatively thin near the pointed end. It is very, but unequally, convex on both faces, each of which has a central ridge, and retains the original surface of the nodule over the whole of the butt-end, whence a trace of it extends along the central ridge of the less convex face to about an inch from the point. The portion of the surface which has been chipped is of a yellowish hue, derived, no doubt, from the matrix in which the specimen lay. This, however, is but a superficial stain, as there are indications of an almost white colour within. This fine implement was found 15th February, 1875, between the Hedges Boss and the left wall of the cave, thirty-six feet from its entrance, in the second foot-level below the surface, that is, in the uppermost foot-level of the Breccia, and having no other object of interest near it.

No. 6,565 is a chert implement 3·7 inches long, 2·7 inches in greatest breadth, and 1·7 inches in greatest thickness, which it attains not far from its centre. It has unfortunately lost one of its extremities—apparently broken off whilst the tool was being made. It is very, perhaps equally, convex on each face, but the centres of convexity are not situated opposite one another ; and, though made from a nodule, not a flake, no part of the original surface remains. A considerable amount of work has been expended on it, and it has been reduced to an edge all round the perimeter except at the broken end. The marginal edge is neither keen nor regular, nor in the same continuous plane. There can be little doubt that it was intended to be a somewhat pointed ovoid tool, and that had it been perfected its form would have been more symmetrical than the breccia tools are usually, and its colour is whiter than that of most of the implements found in the same deposit. It was met with on 13th April, 1875, in the second foot-level of the Breccia, without any other object of interest near it, forty-seven feet from the entrance of the Cave of Inscriptions.

The earlier explorers had but imperfectly examined the material they dug up in this branch of the cavern. On taking it to the daylight, the committee found in it nineteen teeth of bear, twelve of fox, nine of hyæna, two of horse, and one of rhinoceros; a large number of bones, numerous coprolites, a fragment of a marine shell, and six flakes and chips of flint.

The exploration of this cave was completed on 14th June, 1875, having occupied the labour of between eight and nine months.

The following is a list of the specimens found in it in undisturbed ground, inclusive of those mentioned in the Tenth Report :—One bone of bat, a few other bones, a few patches of coprolite, and a bit of charcoal, in the Granular Stalagmite; twenty-seven teeth of hyæna, several of them in jaws or parts of jaws,

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eleven of bear, one of a small rodent, one jaw of fox, numerous bones and fragments of bone, of which six had been charred and a greater number gnawed, a large number of coprolites, and seven tools, flakes, and chips of flint, in the Cave Earth; 213 teeth of bear, some of them in jaws or pieces of jaws, two of lion, in parts of upper jaw, and twenty implements and flakes of flint and chert.

The Recess.—On completing the exploration of the Cave of Inscriptions, operations were at once commenced in a "Recess" occupying its north-western corner, and which was expected to lead to a new external entrance to the cavern. It extends in a north-westerly direction for fully sixty feet, and is of sufficient width for a man to pass easily; beyond this its extent is considerable, but at present it is too narrow for examination. Its floor is a thick sheet of the crystalline or more ancient stalagmite, and is abruptly truncated at the junction of the Recess with the Cave of Inscriptions. It rested on a thick mechanical accumulation, which is unmistakeable breccia, and reaches a higher level than elsewhere in the cavern, so far as is at present known. It was decided to leave intact the Stalagmitic Floor, and in fact to burrow under it; but when the excavation had reached a distance of ten feet, the two walls were found to be so very nearly together as to render it necessary to abandon the work, or to break up the floor and proceed at a higher level. The former course was, though reluctantly, decided on. The only specimens found here were two teeth of bear, a few bones, and an unimportant piece of flint.

The Alcove.—A recess in the eastern wall of the Cave of Inscriptions, near the Hedges Boss, and which received the name of the "Alcove," was next explored. When emptied it proved to be scarcely lofty enough for a man to stand erect, and ten feet in length and breadth, but divided into two compartments by a limestone partition extending nearly across it. Its exploration, which occupied three weeks, was rewarded with thirty-nine "finds" of remains of mammals, including fifty-nine teeth of bear, several of them in portions of jaws; sixteen of fox, all of them in portions of three lower jaws; four of hyæna; numerous bones, including several good specimens, though all of them more or less fragmentary; and one coprolite. The teeth of hyæna, two of the jaws of fox, and the coprolite were met with in cave earth; but the remaining jaw of fox (No. 6,619) was found in the breccia. It was broken into two pieces, which were lying together and contained five teeth, and is the only known relic of the genus in this old deposit. The Alcove contained no trace of flint or chert.

The Great Oven.—A very long, narrow, and low tunnel opening out of the south-western corner of the Cave of Inscriptions has been termed the "Great Oven." Its exploration was begun July 27, 1875, or but four days before the period at which this report closes. It contains a thin layer of cave earth, and a deposit of breccia of unknown depth. The former has already yielded a few traces of hyæna, and the latter a greater number of ursine remains.

On studying the osseous remains found in the Breccia in the branches of the cavern explored during the last twelve months, the following prominent facts arrest attention:—Some of the teeth of bear are those of very old animals and worn almost to the fang. The jaws, though frequently broken, have never lost their lower borders, as is almost uniformly the case with the cave-earth specimens; and none of the bones appear to have been gnawed. In no instance were the bones found lying in their anatomical relations, but different parts of the skeleton were often huddled confusedly together; thus, in No. 6,613, found in the Alcove, a canine tooth adheres to one side of the proximal end of a tibia, and a piece of jaw to another side. Some of the specimens have fretted surfaces, and appear to have been rolled by running water. Many of the bones were broken where they were finally lodged, and the parts, with little or no displacement, reunited with stalagmitic infiltration. Others appear to have been flattened, or more or less crushed, where they lay. Occasionally, in the same rock-like mass of breccia were found bones of very different colours, showing that mere colour is no test of age.

Nor are the remains from the cave earth void of instruction. Up to the present time, wherever the cave earth has been met with, there also have traces of the hyæna been found, either in the form of parts of his skeleton, or his coprolites, or bones scored with his teeth-marks, or jaws divested of their lower borders, or long bones broken after his well-known fashion. But though everywhere present in greater or lesser numbers, these traces became less and less plentiful with increased distance from the external entrances of the cavern, and were very "few and far between" in the chamber most remote from the entrances. Whilst remains of the hyæna were thus met with wherever the cave earth occurred, they were accompanied in the interior by very few of his contemporaries. Thus, whilst the chambers adjacent to the entrances contained teeth and bones of horse, rhinoceros, deer (several species), bear, fox, elephant, ox, lion, wolf, and hare, as well as hyæna—the last being by far the most prevalent—remains of the hyæna alone have been found during the last twelve months. Nor is it without interest to note the branches of the cavern in which remains of the different forms just enumerated were last detected on the way to the Cave of Inscriptions. The hare was not found anywhere in the western division of the cavern—that of which the Cave of Inscriptions is the innermost chamber; the badger, wolf, and ox were represented in the "Charcoal Cave," but not beyond it; and relics of horse, rhinoceros, deer, bear, fox, elephant, and lion did not appear beyond the Long Arcade. Finally, no traces of Machairodus have been met with since the incisor tooth, found July 29, 1872, and described in the Eighth Report, presented at Brighton.

SCIENTIFIC SERIALS

Proceedings of the Berwickshire Naturalists' Field Club, vol. vii. No. ii.—This earliest of Field Clubs continues to sustain the high reputation it has had from the beginning; the present part of the Proceedings shows that the members continue to investigate diligently and to good purpose the natural history and antiquities of the interesting district which forms their field. Most of the papers are of real value, and the best service we can render the club and our readers is to give a list of them:—"On supposed lake or river-terraces near Kelso," by Mr. T. Craig; "On Jedburgh Pears," by Mr. James Tate; "On the antiquity and history of some Border Pears," by Mr. Jas. Hardy; "On evidences of ice-action in Berwickshire," by Mr. W. Stevenson; "Ornithological notes," by Mr. H. Gibb; "On the value of the horse-chestnut (*Æsculus hippocastanum*) as a timber-tree in plantations," by Mr. R. Carr-Ellison; "On Lepidoptera, taken mostly in 1874," a list of captures by various members; "On the signification of some names of places in South Northumberland," by Mr. R. Carr-Ellison; "On the occurrence of the Wild Cat in the border district," by Mr. James Hardy; "A list of local plants and their localities," by Mr. A. Brotherston; "Ornithological notes," by Mr. R. Gray; "On iron and iron slag found at Worm Law and Yeavering," by Mr. Jas. Hardy; "On some flint implements of prehistoric people in Berwickshire,' by Mr. James Hardy, with some beautifully executed illustrations; "A note on a specimen of *Arabis turrita*, discovered at Haining," by Mr. A. H. Borthwick; "On ancient stone cysts and human remains discovered at Aycliffe House, near Ayton," by Mr. J. Hardy, with an illustration; "On a bronze celt found at Linden," by Mr. R. G. Balam, with an illustration; "Some notes on the movements of migratory birds," by Dr. Scott and Mr. Hardy; "Zoological notes," by Messrs. Ferguson and Brotherston; various information on local natural history, by Mr. Hardy; "On some of the birds of Lauderdale," by Mr. A. Kelly; "List of *Araneidea* and *Phalangidea*, collected from Oct. 1871 to Dec. 1874, in Berwickshire and Northumberland, by Mr. James Hardy," by the Rev. O. P. Cambridge; "On Berwickshire insects," by Mr. Hardy, who also has "Contributions to the entomology of the Cheviot Hills."

Third Report of the Winchester College Natural History Society.—This report is altogether very encouraging; it has, as the preface justly states, "a real amount of active and intelligent life" to record during the year. The members as a body seem to be really interested in the work of the Society, and the tendency of that work is evidently to train the members to be accurate observers and independent thinkers. In the preface considerable importance is rightly attached to the collection and exhibition of specimens at the meetings for examination and comment, especially with the view of encouraging the younger members to become intelligent collectors. The report contains a considerable number of papers, nearly all by present or past members, and these papers give evidence of real intelligence, honest study, and in some cases of original observation. The first paper especially, that by W. A. Forbes, is highly creditable to its author; G. L. Hawker's, on Bio-geology, shows considerable knowledge and not a little originality of conception; the paper by N. M. Richardson also deserves mention. But indeed

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